

CHEMTEQ[®]

ChemWipes

Quantitative Surface Contamination Testing System

Leaflet



Surface Contamination Regulations

The current Occupational Safety and Health Administration (OSHA) standards have no surface contamination criteria or quantifications for surface contamination. The standards generally contain housekeeping provisions that address the issue of surface contamination. Exposures to various chemicals are addressed in specific standards for general industry, construction, and shipyard employment. *OSHA housekeeping provisions are generally the most stringent for the metals, which in solid form may contaminate surfaces and become available for ingestion or inhalation if housekeeping practices are poor. OSHA standards for heavy metals contain provisions stating that "surfaces be maintained as free as practicable of accumulations of the toxic metal" [Code of Federal Regulations (CFR) for Occupational Safety and Health Standards 29 CFR 1910].* Useful guidelines are also provided by the United States Department of Energy (DOE), where DOE and its contractors are required to conduct routine surface sampling to determine housekeeping conditions wherever highly toxic and carcinogenic substances such as beryllium and hexavalent chromium [Cr (VI)] are present in operational areas. These criteria, for example, state that for beryllium, the removable contamination level of equipment or item surfaces does not exceed the higher of 0.2 $\mu\text{g}/100\text{ cm}^2$ and for Cr (VI), an acceptable surface contamination level of 7.5 $\mu\text{g}/100\text{ cm}^2$.

Description of The ChemWipe System (US Patent Pending)

The system consists of ChemWipe and Color Comparator (Figure 1).

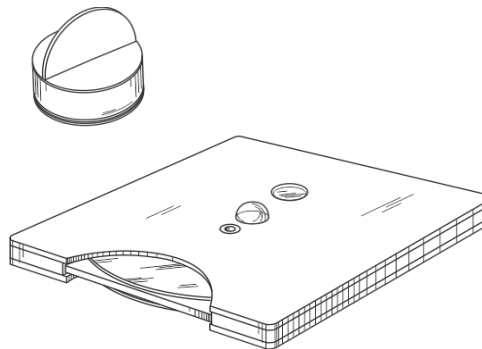


Figure 1

1. The ChemWipe

The ChemWipe mainly consists of a handle, flexible body, indicating layer and collection matrix. The flexible body allows the ChemWipe to collect contaminants on smooth and irregular surfaces and produce uniform color that can be easily quantified with the color comparator (Figure 2).

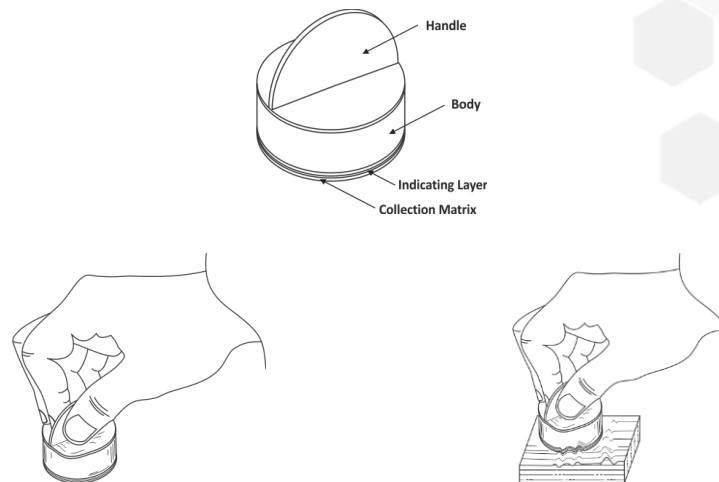


Figure 2

2. The ChemWipe Color Comparator

The color comparator has two wheels:

- a. A color wheel with color scale calibrated and validated to specific quantities of contaminant measured in micrograms (μg).
- b. A gray scale wheel with arbitrary gray colors introduced to enhance the color matching process and it has no effect on determining the mass of the contaminant.

The protective sleeve is a disposable plastic sleeve that functions to protect the color comparator from contamination and prevents cross contamination between samples.

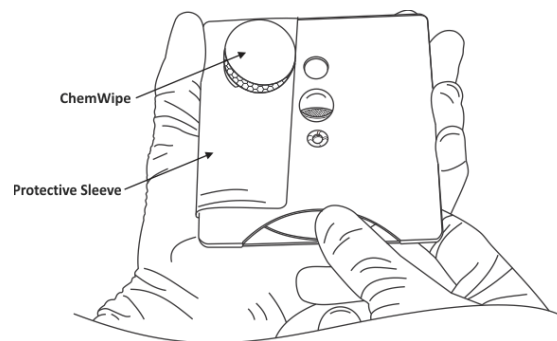


Figure 3

How Does ChemWipe System Work?

- a. Hold the ChemWipe from the handle, preferably using thumb and index fingers.
- b. Swipe the target surface.
- c. Formation of uniform color on the wipe indicates the presence of target contaminant.
- d. Place the wipe upside down on the comparator as shown in figure 3.
- e. Rotate the bottom color wheel in the comparator until the color on the wipe matches the color on the color wheel.
- f. Read the number that appears on the comparator. The number represents the quantity of the contaminant collected on the wipe in micrograms (μg).

How to Determine the Average Concentration of Contaminant on the Surface?

If the wipe shows a color equivalent to 2ug, then it depends on the swiped area to determine the average concentration of the contaminant on the surface.

Example 1:

If the wipe shows color equivalent to 2ug and the swiped area is 10cm x 10cm square, then the average concentration of the contaminant is $2\text{ug}/100\text{cm}^2$ or $0.02/\text{cm}^2$ ($20\text{ng}/\text{cm}^2$), please see figure 4.

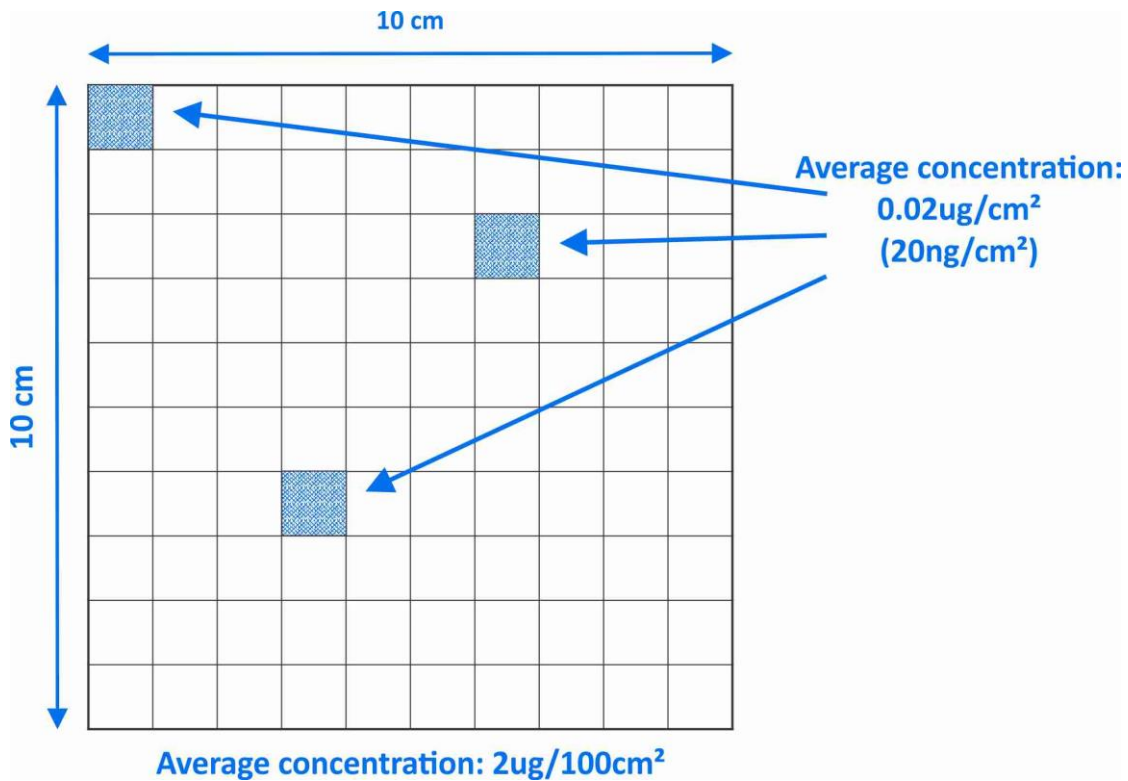


Figure 4

Example 2:

If the wipe shows a color equivalent to 2ug and the swiped area is 20cm x 20cm square, then the average concentration of the contaminant is $2\mu\text{g}/400\text{cm}^2$ or $0.005\mu\text{g}/\text{cm}^2$ ($5\text{ng}/\text{cm}^2$), please see figure 5.

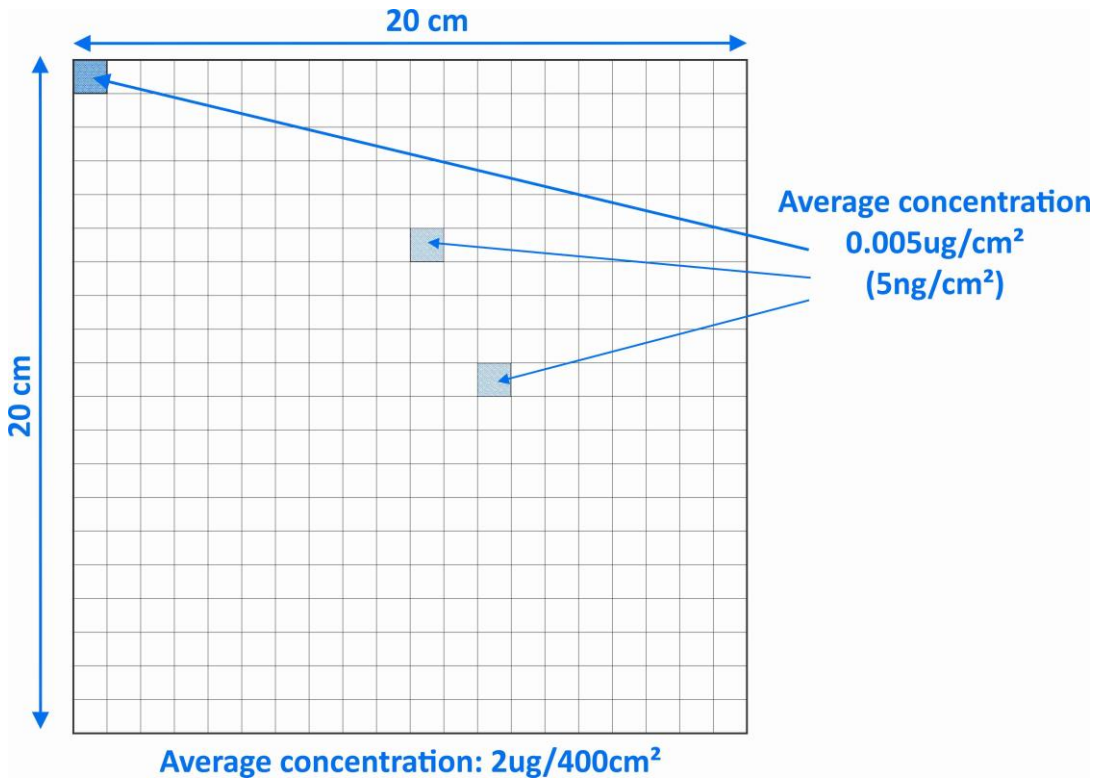


Figure 5

PLEASE CALL OR EMAIL US IF YOU HAVE ANY QUESTIONS REGARDING THE CHEMWIPE SYSTEM



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emission control products